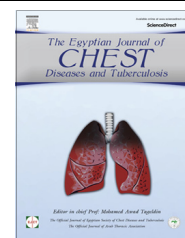




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ORIGINAL ARTICLE

Demography and clinical outcome of pulmonary tuberculosis in Kashmir; 2 year prospective study



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KEYWORDS

Tuberculosis;
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Abstract *Introduction:* Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*, primarily affecting lungs. One-third of the world's population is currently infected with the TB bacillus. Tuberculosis is one of the three primary diseases of poverty. The risk of developing tuberculosis is higher in immunocompromised persons and is a chronic debilitating disease.

Aims and objectives: To study the demographic features and clinical outcome of pulmonary tuberculosis.

Materials and methods: A prospective study involving 72 pulmonary tuberculosis patients above 18 years.

Results: In our study 45 were below the age of 40 years with a mean age of 47 years \pm 12.39, with a male to female ratio of 1.4:1.61; patients were from rural areas and 18 were labourers. Two were HIV positive; fever was the main presenting complaint. Mean haemoglobin was 11.2 \pm 2.48. Mean ESR was 45.2 \pm 12.55. Bronchoscopy was done in 13 patients and 4 had bronchoalveolar lavage positive for AFB. All patients received a daily regimen of ATT. 4 were treated as Cat II, rest were treated as Cat I. 64 patients (88.8%) were cured, 8 (11.1%) are on follow up. No resistance was documented in any of the patients. Treatment related complications were seen in 43 (30.8%).

Conclusion: Tuberculosis most commonly occurs in younger patients, especially from rural areas. Due to the low prevalence of HIV in Kashmir association with HIV was low. The Commonest presentation was fever. Most patients had a good response to daily regimen and the most common drug related side effect was hepatitis.

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Introduction

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. The disease primarily affects lungs. Overall, one-third of the world's population is currently infected with the TB bacillus. 5–10% of the people who are infected

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with TB bacilli (but who are not infected with HIV) become sick or infectious at some time during their life. People with HIV and tuberculosis infection are much more likely to develop active tuberculosis. The risk for developing TB disease is also higher in persons with diabetes, other chronic debilitating diseases leading to immune-compromised state, poor living conditions, tobacco smokers, preexisting structural lung disease etc [1].

It can also affect other tissues of the body. The disease is usually chronic with cardinal features like persistent cough with or without expectoration, intermittent fever, loss of appetite, weight loss, chest pain and haemoptysis [2]. In healthy people, infection with *M. tuberculosis* often causes no symptoms, since the person's immune system acts to "wall off" the bacteria. Tuberculosis is one of the three primary diseases of poverty along with AIDS and malaria [3].

The following profile of patients should be screened for tuberculosis:

- Persistent cough of 2 weeks or more or any duration in HIV positive.
- Fever for more than 2 weeks.
- Unexplained night sweats.
- Unexplained weight loss (more than 1.5 kg in a month).

Aims and objectives

To study the demographic features, clinical presentation and treatment outcome of pulmonary tuberculosis patients at SKIMS, a tertiary care hospital in Kashmir valley.

Materials and methods

A prospective study of tuberculosis patients was conducted in the Infectious Disease Department, Division of Internal Medicine, Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar from June 2013 to May 2015. Tuberculosis patients who visited infectious disease clinic on OPD basis and patients who were admitted in general medicine ward were taken up in this study. For each patient clinical presentation, socio demographic profile and outcome of treatment were recorded interpreted and analysed.

Inclusion criteria

All patients > 18 years of age suspected of pulmonary tuberculosis were included.

Pulmonary tuberculosis was diagnosed on the basis of:

- **Sputum smear for AFB (positive):** two or more initial sputum smear examination positive for AFB or one sputum smear examination positive for AFB plus radiological abnormalities consistent with active pulmonary tuberculosis or one sputum smear positive for AFB plus sputum culture positive for *M. tuberculosis*.
- **Sputum smear for AFB (negative):** those patients who had BAL positive for AFB were also part of study.

All patients were subjected to the following investigations:

- CBC;
- Complete biochemistry including full LFT;
- Urine examination;
- Chest X-ray;
- ECG;
- USG abdomen;
- HIV;
- Sputum for AFB;
- Sputum culture for AFB, (as per clinical correlation);
- Broncho alveolar lavage for AFB staining/culture, (as per clinical correlation);
- Gene Xpert and line probe assay (as per clinical correlation).

Results and observation

In our study of 72 patients of pulmonary tuberculosis we found 45 of them below age of 40 years with a mean age of 47 years \pm 12.39. 61 (84.7%) were from rural areas. 2 patients were found to be HIV positive. 42 (58%) were males and among them 18 (25%) were labourers. Family history of tuberculosis was in 16 patients (22.22%) Tables 1 and 2.

Fever was the presenting complaint in 59 patients (81.9%) followed by cough and haemoptysis in 51 (70%) and 26 (19%) respectively. Other features like weight loss, nausea, chest pain,

Table 2 Occupational status of tuberculosis patients in our study ($n = 72$).

Occupation	Frequency ($n = 72$)	Percentage (%)
Labourers	18	25
Students	14	19.5
Others (mostly elderly)	14	19.5
Housewives	13	18
Govt employee	10	14
Businessmen	3	4
Total	72	100

Table 1 Demographic Characteristic of patients in our study ($n = 72$).

Age		Sex		Residence		Smoking		Married		HIV status		Alcohol/other addiction		Family history	
< 40	> 40	Male	Female	Rural	Urban	Yes	No	Yes	No	Positive	Negative	Absent	Present	Present	Absent
45	27	42	30	61	15	26	46	45	27	2	70	72	0	16	56

Table 3 Presenting complaints of patients in our study ($n = 72$).

Complaints No.	Fever	Cough	Hemoptysis	Weight loss	Nausea vomiting	Chest pain	BLN	Cervical swelling	Decreased appetite
72	59 (81.9%)	51 (70.8%)	19 (26.4%)	8 (11.1%)	6 (8.3%)	7 (9.7%)	14 (19.4%)	1 (1.4%)	9 (12.5%)
<i>P</i> value	0.002	0.0001	0.0001	0.815	1.000	0.936	0.705	0.0001	0.832

breathlessness, cervical swelling, decreased appetite and pain abdomen occurred less frequently [Table 3](#).

In our study the USG chest/abdomen findings included pleural effusion in 11 (23.9%) of cases (p value of 0.056), ascites in 6 (17.6%) of cases (p value of 0.018), hepatosplenomegaly in 11 (35.5%) of cases (p value of 1.000), abdominal lymphadenopathy in 4 (18.2%) of cases (p value of 0.097), omental thickening in 2 (25.0%) of cases (p value of 0.714), and cervical lymphadenopathy in 3 (9.1%) of cases (p value of 0.0001), [Table 4](#).

With regard to CECT chest/abdomen findings mediastinal lymphadenopathy was seen in 13 (32.5%) of cases (p value 0.714), pleural effusion in 7 (17.9%) of cases (p value 0.009), cavitary lesions 27 (87.1%) of cases (p value 0.0001), consolidation in 30 (45.5%) of cases (p value 0.047), abdominal lymphadenopathy (LAP) in 5 (17.0%) of cases (p value 0.023), hepatosplenomegaly (HSM) in 3 (20.0%) of cases (p value 0.264), omental thickening in 2 (1.8%) of cases (p value 0.034), and cervical lymphadenopathy in 2 (7.7%) of cases (p value 0.0001) [Table 5](#).

The treatment outcome of the patients in our study was that; 64 (88.8%) were cured and 8 (11.1%) are on treatment. 4 patients were treated as defaulters (Cat II WHO) rest were treated as Cat I WHO with a daily regime of ATT. In our study there was no relapse and there were no defaulters as shown in [Table 6](#).

In our study, the treatment related complications were; 23 (16.5%) patients had ATT induced hepatitis, 8 (5.7%) had hyperuricemia, 7 (5.04%) had gastritis, 4 (2.88%) had

Table 6 Treatment outcome of patients in our study ($n = 72$).

Outcome	No. of patients ($n = 72$)	Percentage (%)
Cured	64	88.88
Default	0	0
Relapse	0	0
Died	0	0.0
Resistance documented (gene Xpert/line probe assay)	0	0
On treatment	8	11.1
Total	72	100

nausea/vomiting, and 1 (0.72%) had neuropsychiatric manifestation [Table 7](#).

All the patients, underwent baseline investigations, the results were; Hb was 11.2 ± 2.48 g/dl, TLC count was 7.03 ± 2.96 mm³, and platelet count was 235.27 ± 100 mm³. Erythrocyte sedimentation rate was 45.2 ± 12.55 mm h. KFT/LFT were as per [Table 8](#).

Bronchoscopy was done in a total of 13 patients out of which bronchoalveolar lavage was positive for AFB in 4 patients and TBLB was done as described in [Table 9](#).

In our study, 35 (48.6%) patients had underlying comorbidity, 14 (20.85%) had hypertension, 7 (9.7%) had diabetes, 1 (1.38%) had rheumatoid arthritis, 1 (1.38%) had chronic renal failure, 4 (5.5%) had hypothyroidism, 7 (9.7%) had COPD, 1 (1.38%) had Ca lung as shown in [Table 10](#).

Table 4 USG findings in patients in our study ($n = 72$).

USG findings	Pleural effusion	Hepato splenomegaly	Abdominal lymphadenopathy	Omental thickening	Cervical lymphadenopathy
Present	11 (23.9)	11 (35.5%)	4 (18.2%)	2 (25.0%)	3 (9.1%)
Absent	61 (39.6%)	61 (36.1%)	68 (38.2%)	70 (36.5%)	69 (41.3%)
<i>p</i> value	0.056	1.00	0.097	0.714	<0.0001

Table 5 CT findings in patients in our study ($n = 72$).

CT findings	Mediastinal lymphadenopathy	Pleural effusion	Cavitatory lesion	Consolidation	Abdominal lymphadenopathy	Hepato - splenomegaly	Omental thickening	Cervical lymphadenopathy
Present	13 (32.5%)	7 (17.9%)	27 (87.1%)	30 (45.5%)	5 (17.0%)	3 (20.0%)	2 (1.8%)	2 (7.7%)
Absent	59 (36.9%)	65 (40.4%)	45 (26.6%)	41 (30.8%)	67 (39.2%)	69 (37.3%)	70 (38.1%)	70 (40.2%)
<i>p</i> value	0.714	0.009	<0.0001	0.047	0.023	0.264	0.034	0.001

Table 7 Treatment related complications in patients in our study ($n = 72$).

Treatment related complications	No. of patients ($n = 72$)	Percentage (%)
ATT induced hepatitis	23	16.5
Hyperuricemia	8	5.7
Gastritis	7	5.04
Nausea/vomiting	4	2.88
Neuropsychiatric complications	1	0.720
Total	43	30.84

Discussion

The present study was conducted in the Infectious disease division of General Medicine Department, Sheri-I-Kashmir Institute of Medical Sciences, Jammu and Kashmir. In this study 72 patients were enrolled and it was a prospective hospital based study.

The present study, comprised of 72 patients out of which 42 (58.3%) were males and 30 (41.6%) were females with a male to female ratio of 1.4:1. Most of our study group patients (62%) belonged to the age group of 18–40 years of age with mean age of 47 years \pm 12.39 (Table 1) and most of the patients were labourers 18 (25%) followed by student 14 (19.5%). 14 (19.5%) were elderly and not educated, 13 (18%) were housewives, (14%) were employee and 3 (4%) were businessmen. A study conducted by Ogboi et al. [4] at

Table 10 Comorbidities of tuberculosis patients in our study ($n = 72$).

Comorbidities	No of cases	Percentage (%)
Hypertension	15	20.8
Diabetes	7	9.7
Rheumatoid arthritis	1	1.38
Chronic renal failure	1	1.38
Hypothyroidism	4	5.5
COPD	7	9.7
Ca. Lung	1	1.38

Nigeria found that out of 694 cases 200 (28.9%) were unemployed and 79 (11.4%) were students, 154 (22.1%) were artisans, and 168 (24.2%) were not educated. The results were also comparable with a study conducted by Gebretsadik Berhe et al. [5].

In our study majority of the patients were from rural areas. Majority of the patients from rural areas (64.7%) were also seen by Mengistuendris et al. [6]. In our study, 26 (36%) were smokers and 46 (63.8.0%) were non smokers (Table 1). In a study conducted by Jianming wang et al. [7], the proportion of cigarette smoking was 54.6%, and in a study conducted by I. Burnet et al. in South Africa, they have seen 56% and 60% of patients with active and latent TB infection were smokers [8].

In our study, 45 (63%) were married and 27 (36.0%) were unmarried, compared to a study done by Onyebuchi Stephanie Ofoegbu et al. in Nigeria where they have found that 57% of the study population were married [9].

Table 8 Baseline characteristic of tuberculosis patients in our study ($n = 72$).

Baseline investigations	Minimum	Maximum	Mean	Standard deviation
Hb	2.30 g/dl	17.6 g/dl	11.2	2.48
TLC	4.7×10^3 /ul	18.74×10^3 /ul	7.03	2.96
ESR mm/hr	10	75	45.2	12.55
Neutrophils	40.00%	98.00%	71.11	11.63
Lymphocytes	2.00%	58.00%	19.98	10.71
PLT	14×10^3 /ul	530×10^3 /ul	235.27	100.0
Urea (mg/dl)	11	240	34.31	30.3
Creatinine (mg/dl)	0.02	11.60	0.96	1.23
Bilirubin (mg/dl)	0.02	1.55	.56	0.35
AST (U/L)	5	110	32.98	16.64
ALT (U/L)	10	129	35.29	15.9
ALP	51	240	112.26	37.88
Protein (g/dl)	3.5	8.73	6.61	.868
Albumin (g/dl)	2.1	5.7	4.14	.735
LDH (U/L)	67	345	215.63	51.97
Glucose (mg//dl)	65	201	104.33	19.3

Table 9 Bronchoscopy and BAL analysis.

HPE	Caseous necrosis (%)	Chronic granulomatosis lymphadenitis (%)	Langerhans type giant cells (%)	Non caseating granulomas (%)	AFB staining
Bronchoscopy ($n = 13$)	1 (7.69%)	1 (7.69%)	1 (7.69%)	0%	4 (2%)

In our study, 2 (2.77%) were HIV positive. The seroprevalence of HIV among TB patients in a study conducted by Bahl, Singh et al. in Jammu and Kashmir was 1.6% [10]. A study conducted by Mubarik et al. [11] found that out of 1141 patients tested, 26 proved to have HIV 1 infection with no case of HIV 2 detected. More than 42% were non Kashmiris. Heterosexual transmission was the commonest with married out numbering unmarried. However a study conducted by Acharyal [12] found that out of 250 cases of TB admitted, 25 cases (10%) were diagnosed as HIV positive.

A study conducted by Acharya et al. [12] found that cough with expectoration in 128 (51.2%), breathlessness 99 (39.6%) and fever 91 (36.4%) were the chief presenting complaints. Another study conducted by Bras et al. [13], found that most common sign and symptom on admission was weight loss (74.5%), fever (53.8%) and productive cough (43.2%). In our study the most common presentation on admission was: fever in 59 (81.9%) of cases (p value 0.002), cough 51 (70.8%) of cases (p value 0.0001), hemoptysis in 19 (26.4%) of cases (p value 0.0001), and cervical swelling in 1 (1.4%) of cases (p value 0.0001). Our study was concordant with a study conducted by Ismail et al. [14].

Baseline investigations revealed a mean haemoglobin, ESR and total leucocyte count of 11.2, 45.2 and 7.03 respectively with minimum and maximum of these investigations 2.3, 10, 4.7 and 17.6, 75, 18.74 respectively. The minimum neutrophil count was 40.00% and the maximum was 98.00% with a mean of 71.11 ± 11.63 while as minimum lymphocyte count was 2.00% and the maximum was 58.00% with a mean of 19.98 ± 10.71 . Our results are comparable with a study conducted by Singh, Ahluwalia et al. [15] and with a study conducted by Olaniyi et al. [16] in Nigeria.

In our study the drug related side effects were noted in 43 cases (30.8%). ATT induced hepatitis was seen in 23 (16.5%) of the cases, and hyperuricemia in 8 (5.7%). Gastritis in 7 (5.04%), nausea/vomiting 4 (2.88%), and neuropsychiatric 1 (0.72%) (Table 7). Our study is consistent with a study conducted by Omar Kherad et al. [4], who found drug related side effects in 75 (30%) of cases, and was in concordance Denise Eri Onodera Vieira et al. [17].

The treatment outcome of our study revealed that, 64 (88.8%) of cases were cured, 8 (11.1%) were on treatment and they are on follow up, there were no relapse case nor any defaulter in our study (Table 6). Mengistu Endris et al. found in his study, the overall five year treatment success rate of the TB patients was 94.8%, slightly higher as compared to our study because the total number of patients in there study was 400 [6], comparable to other study conducted by Gebretsadik Berhe et al. [5].

In our study 36 (50%) of the cases had underlying comorbidity, hypertension 15 (20.8%) and diabetes 7 (9.7%) were most common Table 8. The study conducted by Nissapatorn et al. [18] found that lungs were the most common location (91.4%) in tuberculosis with diabetes.

In our study the common USG findings were pleural effusion 11 (23.9%), ascites 6 (17.6%), hepatosplenomegaly 11 (35.5%), abdominal lymphadenopathy in 4 (18.2%), omental thickening 2 (25.0%), and cervical LAP 3 (9.1%) of cases (p value 0.0001).

The common CT findings in our study were: mediastinal lymphadenopathy was seen in 13 (32.5%) of cases, pleural effusion 7 (17.9%) of cases (p value 0.009), cavitary lesions

in 27 (87.1%) of cases (p value 0.0001), consolidation 30 (45.5%) of cases (p value 0.047), abdominal LAP 5 (17.0%) of cases (p value 0.023), and omental thickening 2 (1.8%) of cases (p value 0.034).

The most common CT findings in a study conducted by Gina Conchari Cabrer et al. [19] were consolidation (63%), micronodules (58%), mediastinal LAP (47%), pleural effusion (31%), and cavitation 4 (21%).

Conclusion

Disturbing fact from this study reveals that tuberculosis haunts younger productive age, in an age group of 20–40 years (62%) with most patients being from rural area where poverty, ignorance and lack of adequate health facility still prevail. Due to the low prevalence of HIV in Kashmir association with HIV was low. Commonest presentation was fever, cough and hemoptysis. Most patients have a good response and the most common drug related side effect was hepatitis and is quite prevalent in our community which further needs to be assessed in larger studies especially with regard to genetic aspects.

The present study revealed that noncompliance is not a pressing issue and the level of resistance is low in our community. Response rate of daily regimen seems to be better although it needs to be further studied in larger studies.

Conflict of interest

None.

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